

CLAIMS

What is claimed is:

- 5        1. A method of recycling polyurethane-containing material comprising:
  - combining a polyurethane-containing material with dimethylsulfoxide (DMSO);
    - forming a solution of said polyurethane-containing material and said dimethylsulfoxide (DMSO);
      - 10        adding a non-solvent to said polyurethane solution to form a suspension of polyurethane in a dimethylsulfoxide (DMSO)/non-solvent mixture; and
        - removing said dimethylsulfoxide (DMSO) to form a suspension of polyurethane in said non-solvent.
  - 15        2. The method of claim 1 wherein said polyurethane-containing material is chosen from the group consisting of foam trimmings, foam buns and foam skin, changeover blocks, off-specification material, polyurethane powder, molding mushrooms, fabrication scrap and post-consumer waste.
  - 20        3. The method of claim 1 wherein said polyurethane-containing material is prime polyurethane material.

4. The method of claim 1 further comprising applying heat to said polyurethane-containing material and said solvent during said combining step.

5. The method of claim 1 further comprising adding a filtration step after 5 said forming a solution step and filtering said solution.

6. A method of recycling polyurethane-containing material comprising:  
combining a polyurethane-containing material with dimethylsulfoxide (DMSO);

10 forming a solution of said polyurethane-containing material and said dimethylsulfoxide (DMSO), and

spray drying said solution to produce fine particles of said polyurethane-containing material.

15 7. The method of claim 6 wherein said polyurethane-containing material is chosen from the group consisting of foam trimmings, foam buns and foam skin, changeover blocks, off-specification material, polyurethane powder, molding mushrooms, fabrication scrap and post-consumer waste.

20 8. The method of claim 6 wherein said polyurethane-containing material is prime polyurethane material.

9. The method of claim 6 further comprising applying heat to said polyurethane-containing material and said solvent during said combining step.

10. The method of claim 6 further comprising adding a filtration step after said forming a solution step and filtering said solution.

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11. The method of claim 6 further comprising recycling said solvent after said spray drying step.

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10. A method of forming an adhesive using polyurethane-containing material comprising:

combining a polyurethane-containing material with a solvent;

15 forming a solution of said polyurethane-containing material and said solvent; and

binding a plurality of materials with said solution of said polyurethane-containing material and said solvent wherein said solvent is allowed to evaporate.

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11. The method of claim 10 wherein said solvent is a polar, aprotic solvent.

20 12. The method of claim 10 wherein said solvent is chosen from the group consisting of dimethylsulfoxide (DMSO), 1-methyl-2-pyrrolidone (NMP), N, N-dimethylformamide (DMF), acetonitrile, tetrahydrofuran (THF), hexamethylphosphoric acid triamide (HMPT) and mixtures thereof.

13. The method of claim 10 wherein said polyurethane-containing material is chosen from the group consisting of foam trimmings, foam buns and foam skin, changeover blocks, off-specification material, polyurethane powder, molding mushrooms, fabrication scrap and post-consumer waste.

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14. The method of claim 10 wherein said polyurethane-containing material is prime polyurethane material.

15. The method of claim 10 further comprising applying heat to said  
10 polyurethane-containing material and said solvent during said combining step.

16. The method of claim 10 further comprising adding a filtration step after said forming a solution step and filtering said solution.

15 17. A method of binding using polyurethane-containing material comprising:  
combining a polyurethane-containing material with dimethylsulfoxide (DMSO);

forming a solution of said polyurethane-containing material and said dimethylsulfoxide (DMSO); and

20 binding a fibrous materials including at least one of a cellulose fiber, recycled carpet fiber, glass fiber and scrap materials from industrial parts that may contain various mineral, synthetic or organic fibers, wherein said fiberous materials with said solution of said polyurethane-containing material is heated and pressurized to remove said solvent and produce a polyurethane-fiber composite material.

18. The method of claim 17 wherein said polyurethane-containing material is chosen from the group consisting of foam trimmings, foam buns and foam skin, changeover blocks, off-specification material, polyurethane powder, molding 5 mushrooms, fabrication scrap and post-consumer waste.

19. The method of claim 17 wherein said polyurethane-containing material is prime polyurethane material.

10 20. The method of claim 17 further comprising applying heat to said polyurethane-containing material and said solvent during said combining step.

21. The method of claim 17 further comprising adding a filtration step after said forming a solution step and filtering said solution.

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22. A method of recycling polyurethane-containing material comprising:  
combining a polyurethane-containing material with dimethylsulfoxide (DMSO);  
forming a solution of said polyurethane-containing material and said 20 dimethylsulfoxide (DMSO); and  
separating polyurethane-containing material from said solution and producing polyurethane powder.

23. The method of claim 22 wherein said polyurethane-containing material is chosen from the group consisting of foam trimmings, foam buns and foam skin, changeover blocks, off-specification material, polyurethane powder, molding mushrooms, fabrication scrap and post-consumer waste.

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24. The method of claim 22 wherein said polyurethane-containing material is prime polyurethane material.

10 25. The method of claim 22 further comprising applying heat to said polyurethane-containing material and said solvent during said combining step.

26. The method of claim 22 further comprising adding a filtration step after said forming a solution step and filtering said solution.

15 27. The method of claim 22 wherein said separation step comprises evaporation of said solvent.

28. The method of claim 22 wherein said separation step comprises freeze drying said solution.

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28. The method of claim 22 wherein said separation step comprises precipitating said polyurethane powder from said solution.